I/WE CLAIM:

1. A debris removal system for the removal of plasma produced residue debris on a reflecting surface of an EUV collector in an EUV light source, wherein the reflecting surface comprises a first material and the residue debris comprises a second material comprising:

a controlled sputtering ion source comprising:

a gas comprising the atoms of the sputtering ion material;

a stimulating mechanism exciting the atoms of the sputtering ion material into an ionized state, the ionized state being selected to have a distribution around a selected energy peak that has a high probability of sputtering the second material and a very low probability of sputtering the first material.

2. The apparatus of claim 1 further comprising:

the stimulating mechanism is an RF or microwave induction mechanism.

3. The apparatus of claim 1 further comprising:

the gas is maintained at a pressure that in part determines the selected energy peak.

4. The apparatus of claim 2 further comprising:

the gas is maintained at a pressure that in part determines the selected energy peak.

5. The apparatus of claim 1 further comprising:

the stimulating mechanism creates an influx of ions of the sputtering ion material that creates a sputter density of atoms of the second material from the reflector surface that equals or exceeds the influx rate of the plasma debris atoms of the second material.

6. The apparatus of claim 2 further comprising:

the stimulating mechanism creates an influx of ions of the sputtering ion material that creates a sputter density of atoms of the second material from the reflector surface that equals or exceeds the influx rate of the plasma debris atoms of the second material.

7. The apparatus of claim 3 further comprising:

the stimulating mechanism creates an influx of ions of the sputtering ion material that creates a sputter density of atoms of the second material from the reflector surface that equals or exceeds the influx rate of the plasma debris atoms of the second material.

8. The apparatus of claim 4 further comprising:

the stimulating mechanism creates an influx of ions of the sputtering ion material that creates a sputter density of atoms of the second material from the reflector surface that equals or exceeds the influx rate of the plasma debris atoms of the second material.

9. The apparatus of claim 1 further comprising:

the reflecting surface is a normal angle of incidence multilayer reflector that is highly reflective to EUV light comprising a laminate of layers of the first material and layers of a third material.

10. The apparatus of claim 2 further comprising:

the reflecting surface is a normal angle of incidence multilayer reflector that is highly reflective to EUV light comprising a laminate of layers of the first material and layers of a third material.

11. The apparatus of claim 3 further comprising:

the reflecting surface is a normal angle of incidence multilayer reflector that is highly reflective to EUV light comprising a laminate of layers of the first material and layers of a third material.

12. The apparatus of claim 4 further comprising:

the reflecting surface is a normal angle of incidence multilayer reflector that is highly reflective to EUV light comprising a laminate of layers of the first material and layers of a third material.

13. The apparatus of claim 5 further comprising:

the reflecting surface is a normal angle of incidence multilayer reflector that is highly reflective to EUV light comprising a laminate of layers of the first material and layers of a third material.

14. The apparatus of claim 6 further comprising:

the reflecting surface is a normal angle of incidence multilayer reflector that is highly reflective to EUV light comprising a laminate of layers of the first material and layers of a third material.

15. The apparatus of claim 7 further comprising:

the reflecting surface is a normal angle of incidence multilayer reflector that is highly reflective to EUV light comprising a laminate of layers of the first material and layers of a third material.

16. The apparatus of claim 8 further comprising:

the reflecting surface is a normal angle of incidence multilayer reflector that is highly reflective to EUV light comprising a laminate of layers of the first material and layers of a third material.

17. The apparatus of claim 1 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

18. The apparatus of claim 2 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

19. The apparatus of claim 3 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

20. The apparatus of claim 4 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

25. The apparatus of claim 5 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

26. The apparatus of claim 6 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

27. The apparatus of claim 7 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

28. The apparatus of claim 8 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

29. The apparatus of claim 9 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

30. The apparatus of claim 10 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

31. The apparatus of claim 11 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

32. The apparatus of claim 12 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

33. The apparatus of claim 13 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

34. The apparatus of claim 14 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

35. The apparatus of claim 15 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

36. The apparatus of claim 16 further comprising:

the sputter thickness rate for sputtering of the first material by the second material is at or below a rate that will result in a single layer of the first material sustaining such sputtering for greater than a selected lifetime.

37. The apparatus of claim 17, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

38. The apparatus of claim 18, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

39. The apparatus of claim 19, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

40. The apparatus of claim 20, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

41. The apparatus of claim 21, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

42. The apparatus of claim 22, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

43. The apparatus of claim 23 further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

44. The apparatus of claim 24 further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

45. The apparatus of claim 25 further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

46. The apparatus of claim 26, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

47. The apparatus of claim 27, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

48. The apparatus of claim 28, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

49. The apparatus of claim 29, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

50. The apparatus of claim 30, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have

more favorable properties when exposed to ambient or operating environments than those of the first material.

51. The apparatus of claim 31, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

52. The apparatus of claim 32, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

53. The apparatus of claim 33, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

54. The apparatus of claim 34, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth

material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

55. The apparatus of claim 35, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

56. The apparatus of claim 36, further comprising:

the reflecting surface comprises a capping layer comprising a fourth material selected to have a sputter thickness rate that will also sustain sputtering by the second material at or below a rate that will result in a single layer of the fourth material sustaining such sputtering for greater than the selected time and to have more favorable properties when exposed to ambient or operating environments than those of the first material.

57. The apparatus of claim 1 further comprising:

the first material is molybdenum.

58. The apparatus of claim 2 further comprising:

the first material is molybdenum.

59. The apparatus of claim 3 further comprising:

the first material is molybdenum.

60. The apparatus of claim 4 further comprising:

the first material is molybdenum.

61. The apparatus of claim 5 further comprising:
the first material is molybdenum.

62. The apparatus of claim 6 further comprising:
the first material is molybdenum.

63. The apparatus of claim 8 further comprising:
the first material is molybdenum.

64. The apparatus of claim 9 further comprising:
the first material is molybdenum.

65. The apparatus of claim 1 further comprising:
the second material comprises lithium.

66. The apparatus of claim 2 further comprising:
the second material comprises lithium.

67. The apparatus of claim 3 further comprising:
the second material comprises lithium.

68. The apparatus of claim 4 further comprising:
the second material comprises lithium.

69. The apparatus of claim 5 further comprising:
the second material comprises lithium.

70. The apparatus of claim 6 further comprising:
the second material comprises lithium.

71. The apparatus of claim 7 further comprising:
the second material comprises lithium.

72. The apparatus of claim 8 further comprising:
the second material comprises lithium.

73. The apparatus of claim 1 further comprising:
the sputtering ion material comprises He.

74. The apparatus of claim 2 further comprising:
the sputtering ion material comprises He.

75. The apparatus of claim 3 further comprising:
the sputtering ion material comprises He.

76. The apparatus of claim 4 further comprising:
the sputtering ion material comprises He.

77. The apparatus of claim 5 further comprising:
the sputtering ion material comprises He.

78. The apparatus of claim 6 further comprising:
the sputtering ion material comprises He.

79. The apparatus of claim 7 further comprising:
the sputtering ion material comprises He.

80. The apparatus of claim 8 further comprising:
the sputtering ion material comprises He.

81. The apparatus of claim 1 further comprising:

a heater element operatively coupled to the reflective surface heating the reflective surface independently of the stimulating mechanism and the ambient operating environment of the reflective surface.

82. The apparatus of claim 2 further comprising:

a heater element operatively coupled to the reflective surface heating the reflective surface independently of the stimulating mechanism and the ambient operating environment of the reflective surface.

83. The apparatus of claim 3 further comprising:

a heater element operatively coupled to the reflective surface heating the reflective surface independently of the stimulating mechanism and the ambient operating environment of the reflective surface.

84. The apparatus of claim 4 further comprising:

a heater element operatively coupled to the reflective surface heating the reflective surface independently of the stimulating mechanism and the ambient operating environment of the reflective surface.

85. The apparatus of claim 5 further comprising:

a heater element operatively coupled to the reflective surface heating the reflective surface independently of the stimulating mechanism and the ambient operating environment of the reflective surface.

86. The apparatus of claim 6 further comprising:

a heater element operatively coupled to the reflective surface heating the reflective surface independently of the stimulating mechanism and the ambient operating environment of the reflective surface.

87. The apparatus of claim 7 further comprising:

a heater element operatively coupled to the reflective surface heating the reflective surface independently of the stimulating mechanism and the ambient operating environment of the reflective surface.

88. The apparatus of claim 8 further comprising:

a heater element operatively coupled to the reflective surface heating the reflective surface independently of the stimulating mechanism and the ambient operating environment of the reflective surface.

89. The apparatus of claim 1 further comprising:

the stimulating mechanism is connected to the reflecting surface and comprises a signal generator.

90. The apparatus of claim 2 further comprising:

the stimulating mechanism is connected to the reflecting surface and comprises a signal generator.

91. The apparatus of claim 3 further comprising:

the stimulating mechanism is connected to the reflecting surface and comprises a signal generator.

92. The apparatus of claim 4 further comprising:

the stimulating mechanism is connected to the reflecting surface and comprises a signal generator.

93. The apparatus of claim 5 further comprising:

the stimulating mechanism is connected to the reflecting surface and comprises a signal generator.

94. The apparatus of claim 6 further comprising:

the stimulating mechanism is connected to the reflecting surface and comprises a signal generator.

95. The apparatus of claim 7 further comprising:

the stimulating mechanism is connected to the reflecting surface and comprises a signal generator.

96. The apparatus of claim 8 further comprising:

the stimulating mechanism is connected to the reflecting surface and comprises a signal generator.

97. The apparatus of claim 89 further comprising:

the stimulating mechanism provides a signal that is essentially constant during an ignition time and a high frequency alternating signal during at least a portion of the time between the ignition time and a subsequent ignition time.

98. The apparatus of claim 90 further comprising:

the stimulating mechanism provides a signal that is essentially constant during an ignition time and a high frequency alternating signal during at least a portion of the time between the ignition time and a subsequent ignition time.

99. The apparatus of claim 91 further comprising:

the stimulating mechanism provides a signal that is essentially constant during an ignition time and a high frequency alternating signal during at least a portion of the time between the ignition time and a subsequent ignition time.

100. The apparatus of claim 92 further comprising:

the stimulating mechanism provides a signal that is essentially constant during an ignition time and a high frequency alternating signal during at least a portion of the time between the ignition time and a subsequent ignition time.

101. The apparatus of claim 93 further comprising:

the stimulating mechanism provides a signal that is essentially constant during an ignition time and a high frequency alternating signal during at least a portion of the time between the ignition time and a subsequent ignition time.

102. The apparatus of claim 94 further comprising:

the stimulating mechanism provides a signal that is essentially constant during an ignition time and a high frequency alternating signal during at least a portion of the time between the ignition time and a subsequent ignition time.

103. The apparatus of claim 95 further comprising:

the stimulating mechanism provides a signal that is essentially constant during an ignition time and a high frequency alternating signal during at least a portion of the time between the ignition time and a subsequent ignition time.

104. The apparatus of claim 96 further comprising:

the stimulating mechanism provides a signal that is essentially constant during an ignition time and a high frequency alternating signal during at least a portion of the time between the ignition time and a subsequent ignition time.

105. The apparatus of claim 97 further comprising:

the stimulating mechanism comprises a current generator that provides a first essentially constant direct current during the ignition time and a second opposite polarity essentially constant direct current during the time between the ignition time and a subsequent ignitions time.

106. The apparatus of claim 98 further comprising:

the stimulating mechanism comprises a current generator that provides a first essentially constant direct current during the ignition time and a second opposite polarity essentially constant direct current during the time between the ignition time and a subsequent ignitions time.

107. The apparatus of claim 99 further comprising:

the stimulating mechanism comprises a current generator that provides a first essentially constant direct current during the ignition time and a second opposite polarity essentially constant direct current during the time between the ignition time and a subsequent ignitions time.

108. The apparatus of claim 100 further comprising:

the heater element comprises a current generator that provides a first essentially constant direct current during the ignition time and a second opposite polarity essentially constant direct current during the time between the ignition time and a subsequent ignitions time.

109. The apparatus of claim 101 further comprising:

the stimulating mechanism comprises a current generator that provides a first essentially constant direct current during the ignition time and a second opposite polarity essentially constant direct current during the time between the ignition time and a subsequent ignitions time.

110. The apparatus of claim 102 further comprising:

the stimulating mechanism comprises a current generator that provides a first essentially constant direct current during the ignition time and a second opposite polarity essentially constant direct current during the time between the ignition time and a subsequent ignitions time.

111. The apparatus of claim 103 further comprising:

the stimulating mechanism comprises a current generator that provides a first essentially constant direct current during the ignition time and a second opposite polarity essentially constant direct current during the time between the ignition time and a subsequent ignitions time.

112. The apparatus of claim 104 further comprising:

the stimulating mechanism comprises a current generator that provides a first essentially constant direct current during the ignition time and a second opposite polarity essentially constant direct current during the time between the ignition time and a subsequent ignitions time.

113. A multi-layer reflecting coating forming an EUV reflective surface comprising:

an inter-diffusion barrier layer comprising a carbide selected from the group SiC, ZrC and NbC.

114. A multi-layer reflecting coating forming an EUV reflective surface comprising:

an inter-diffusion barrier layer comprising a boride selected from the group ZrB_2 and NbB_2.

115. A multi-layer reflecting coating forming an EUV reflective surface comprising:

an inter-diffusion barrier layer comprising a disilicide selected from the group $ZrSi_2$ and $NbSi_2$.

116. A multi-layer reflecting coating forming an EUV reflective surface comprising:

an inter-diffusion barrier layer comprising a nitride selected from the group BN, ZrN, NbN, ScN and Si_3N_4.

117. A multi-layer reflecting coating forming an EUV reflective surface comprising:

a spectral filter tuned to selectively highly reflect light in a band centered about at a first preferred wavelength and to significantly reduce the reflection of light at a band centered about a second wavelength.

118. The apparatus of claim 117 further comprising:

the spectral filter comprises a plurality of nested grazing angle of incidence shells comprising reflective surfaces comprising the multi-layer reflective coating.

119. An EUV light source collector comprising:

a plasma ignition point;

a collecting mirror having a focus at the plasma ignition point and comprising a normal angle of incidence multi-layer reflecting surface;

a focusing spectral filter comprising a plurality of nested grazing angle of incidence shells comprising reflective surfaces comprising multi-layer grazing angle of incidence reflective surfaces.

120. The apparatus of claim 119 further comprising:

the grazing angle of incidence reflective surfaces are selected to differentially reflect a first band of EUV light about a first center wavelength and a second band of EUV light about a second center wavelength within some range of grazing angle of incidence within which the light from the collecting mirror is incident upon respective ones of the plurality of shells.

121. The apparatus of claim 119 further comprising:

the collecting mirror comprises a spherical reflecting surface.

122. The apparatus of claim 120 further comprising:

the collecting mirror comprises a spherical reflecting surface.

123. An EUV light source collector comprising:

a plasma ignition point:

an elliptical collector mirror having a first focus at the plasma ignition point and a second focus at an intermediate focus of the EUV light source;

a debris shield intermediate the plasma ignition point and the elliptical collector mirror comprising a plurality of radially extending channels extending from the first focus and in symmetry about an axis of rotation passing through the first focus and aligned to the longitudinal axis of the elliptical collector mirror.

124. The apparatus of claim 123 further comprising:

the plurality of channels are formed between a plurality of generally planer foils extending radially from the first focus and in symmetry about an axis of rotation passing through the first focus and aligned to the longitudinal axis of the collector mirror.

125. The apparatus of claim 123 further comprising:

the elliptical collecting mirror comprising an aperture centered on the longitudinal axis of the elliptical collector mirror permitting irradiation of the plasma ignition point with a laser beam.

126. The apparatus of claim 124 further comprising:

the elliptical collecting mirror comprising an aperture centered on the longitudinal axis of the elliptical collector mirror permitting irradiation of the plasma ignition point with a laser beam.

127. The apparatus of claim 123 further comprising:

a plasma ignition point;

a first collecting mirror comprising an elliptical reflecting surface having a first focus at the plasma ignition point;

a second collecting mirror comprising a section of a spherical mirror having a center at the plasma ignition point and disposed to collect light not striking the first collecting mirror and reflecting such light onto the first collecting mirror focused through the first focus of the first collecting mirror.

128. A method of reclaiming EUV light source collectors comprising a reflective surface that has become contaminated with debris comprising:

opto-chemically cleaning the collector reflective surfaces in a cleaning chamber containing a carbon oxidizer containing gas and under irradiation from an ultraviolet light source.

129. The method of claim 128 further comprising:

the irradiating step is done with a light source irradiating from essentially a point source at essentially the point source location corresponding the EUV light source plasma ignition point of the collector in normal use.

130. The apparatus of claim 128 further comprising:

the ultraviolet light source is a DUV light source.

131. The apparatus of claim 129 further comprising:

the ultraviolet light source is a DUV light source.

132. A method of continuous removal of debris from a collector reflecting surface in an EUV light source for the removal of plasma produced residue debris on the reflecting surface, wherein the reflecting surface comprises a first material and the residue debris comprises a second material comprising the steps of:

creating a controlled sputtering ion source comprising the steps of:

providing a gas comprising the atoms of the sputtering ion material; and,

exciting the atoms of the sputtering ion material into an ionized state, the ionized state being selected to have a distribution around a selected energy peak that has a high probability of sputtering the second material and a very low probability of sputtering the first material.

133. A method of continuous removal of debris from a collector reflecting surface in an EUV light source for removal of plasma produced residue debris on the reflecting surface, wherein the reflecting surface comprises a first material and the residue debris comprises a second material and compounds of the second material comprising the steps of:

heating the reflecting surface to effectively remove residue debris comprising the second material deposited on the reflecting surface; and,

creating a controlled sputtering ion source comprising the steps of:

providing a gas comprising the atoms of the sputtering ion material; and,

exciting the atoms of the sputtering ion material into an ionized state, the ionized state being selected to have a distribution around a selected energy peak that has a high probability of sputtering the compounds of the second material and a very low probability of sputtering the first material.

134. A method of continuous removal of debris from a collector reflecting surface in an EUV light source for removal of plasma produced residue debris on the reflecting surface, wherein the reflecting surface comprises a first material and the residue debris comprises a second material and compounds of the second material comprising the steps of:

heating the reflecting surface to effectively remove residue debris comprising the second material deposited on the reflecting surface; and,

sputtering the compounds of the second material deposited on the reflecting surface using ions of the second material produced in the plasma.

135. The apparatus of claim 65 further comprising:

the second material is a compound of lithium.

136. The apparatus of claim 66 further comprising:

the second material is a compound of lithium.

137. The apparatus of claim 67 further comprising:

the second material is a compound of lithium.

138. The apparatus of claim 68 further comprising:

the second material is a compound of lithium.

139. The apparatus of claim 69 further comprising:

the second material is a compound of lithium.

140. The apparatus of claim 70 further comprising:

the second material is a compound of lithium.

141. The apparatus of claim 71 further comprising:

the second material is a compound of lithium.

142. The apparatus of claim 72 further comprising:

the second material is a compound of lithium.

143. The apparatus of claim 81 further comprising:

the heater element maintains the temperature of the reflecting surface at a temperature sufficiently high to evaporate the second material and low enough not to damage the reflecting surface materials.

144. The apparatus of claim 82 further comprising:

the heater element maintains the temperature of the reflecting surface at a temperature sufficiently high to evaporate the second material and low enough not to damage the reflecting surface materials.

145. The apparatus of claim 83 further comprising:

the heater element maintains the temperature of the reflecting surface at a temperature sufficiently high to evaporate the second material and low enough not to damage the reflecting surface materials.

146. The apparatus of claim 84 further comprising:

the heater element maintains the temperature of the reflecting surface at a temperature sufficiently high to evaporate the second material and low enough not to damage the reflecting surface materials.

147. The apparatus of claim 85 further comprising:

the heater element maintains the temperature of the reflecting surface at a temperature sufficiently high to evaporate the second material and low enough not to damage the reflecting surface materials.

148. The apparatus of claim 86 further comprising:

the heater element maintains the temperature of the reflecting surface at a temperature sufficiently high to evaporate the second material and low enough not to damage the reflecting surface materials.

149. The apparatus of claim 87 further comprising:

the heater element maintains the temperature of the reflecting surface at a temperature sufficiently high to evaporate the second material and low enough not to damage the reflecting surface materials.

150. The apparatus of claim 88 further comprising:

the heater element maintains the temperature of the reflecting surface at a temperature sufficiently high to evaporate the second material and low enough not to damage the reflecting surface materials.

151. The apparatus of claim 143 further comprising:

the temperature is between 400°C and 700°C.

152. The apparatus of claim 144 further comprising:

the temperature is between 400°C and 700°C.

153. The apparatus of claim 145 further comprising:

the temperature is between 400°C and 700°C.

154. The apparatus of claim 146 further comprising:

the temperature is between 400°C and 700°C.

155. The apparatus of claim 147 further comprising:

the temperature is between 400°C and 700°C.

156. The apparatus of claim 148 further comprising:
the temperature is between 400°C and 700°C.

157. The apparatus of claim 149 further comprising:
the temperature is between 400°C and 700°C.

158. The apparatus of claim 150 further comprising:
the temperature is between 400°C and 700°C.

159. The apparatus of claim 151 further comprising:
the temperature is between 450°C and 650° C.

160. The apparatus of claim 152 further comprising:
the temperature is between 450°C and 650° C.

161. The apparatus of claim 153 further comprising:
the temperature is between 450°C and 650° C.

162. The apparatus of claim 154 further comprising:
the temperature is between 450°C and 650° C.

163. The apparatus of claim 155 further comprising:
the temperature is between 450°C and 650° C.

164. The apparatus of claim 156 further comprising:
the temperature is between 450°C and 650° C.

165. The apparatus of claim 157 further comprising:

the temperature is between 450°C and 650° C.

166. The apparatus of claim 158 further comprising:

the temperature is between 450°C and 650° C.